Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Stinkingwater Salmonid Project

Bonneville project number, if an ongoing project 9701900

Business name of agency, institution or organization requesting funding
Burns Paiute Tribe

Business acronym (if appropriate) BPT

Proposal contact person or principal investigator:

Name Dyan Straughan/Daniel Gonzalez
Mailing Address HC-71 100 Pa'Si'Go'
City, ST Zip Burns, Oregon 97720
Phone (541) 573-2420
Fax (541) 573-2422
Email address dyan@orednet.org/gonfish@orednet.org

Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name

NPPC Program Measure Number(s) which this project addresses.
10.1; 10.1A2; 10.5; 10.5A; 10.5B1; 10.5B2; 10.6

NMFS Biological Opinion Number(s) which this project addresses.

Other planning document references.
Malheur River Basin Fish Management Plan, 1990, Oregon Department of Fish and Wildlife. Malheur Wild and Scenic River Management Plan, (USDA, 1993)

Subbasin.
Malheur River Subbasin

Short description.
Develop strategies based upon base line habitat surveys and life history traits to enhance and protect resident fish in the Middle Fork Malheur River and mitigate for resident and anandromous fish losses due to loss of habitat and other factors.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
	Anadromous fish		Construction	+	Watershed
X	Resident fish		O & M	+	Biodiversity/genetics
	Wildlife		Production	X	Population dynamics
	Oceans/estuaries	X	Research	+	Ecosystems
	Climate	+	Monitoring/eval.	+	Flow/survival
	Other	+	Resource mgmt	+	Fish disease
			Planning/admin.		Supplementation
			Enforcement	+	Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Identify overall habitat conditions	a	Habitat surveys (Hanking and Reeves method)
		b	Determine water quality, measuring DO,pH and Conductivity--HOBO's for water temperature monitoring
2	Quantify population structure in	c	Fish surveys (ODFW methods)

	current redband and bull trout populations		
		e	Radio Telemetry
		f	Screw Traps
3	Formulate enhancement and management recommendations	g	Analyze information and fill in information gaps
4	Implement enhancement and management recommendations	h	Prioritize enhancement and management recommendations
		i	Implement recommendations by priority

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	5/1997	10/1999	30.00%
2	5/1997	10/1999	30.00%
3	11/1999	3/2000	10.00%
4	3/2000	12/2002	30.00%
			TOTAL 100.00%

Schedule constraints.
Identifing schedule constraints is very difficult due to the stochastic events that can occur

Completion date.
2002+

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	Dyan Straughan and Daniel Gonzalez (2080hrs @$14) and 2 field assistants (1080 hr @$8.10)	$75,736
Fringe benefits	25%	$18,934
Supplies, materials, non-expendable property	Waders, Dry suits, Snorke gear, HOBO's etc. Genetic supplies	$24,500
Operations & maintenance		
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Tribal lease of two Ford F-150's, Building insurance, upkeep, ect.	$22,000

PIT tags	# of tags:	
Travel	130 mi/day, 2 veh/day, 170 days/yr @.31/mi	$13,702
Indirect costs	29%	$44,913
Subcontracts		
Other		
TOTAL		$199,785

Outyear costs

Outyear costs	**FY2000**	**FY01**	**FY02**	**FY03**
Total budget	$200,000	$200,000	$200,000	$0
O&M as % of total	10.00%	10.00%	10.00%	0.00%

Section 6. Abstract

Abstract

Past land use practices and construction of hydroelectric facilities have degraded the Middle Fork Malheur River to the point where survival of the remaining native salmonids are severely threatened. The goal of this project is to gain an understanding of the life history and genetic composition of the native salmonids in the Malheur River Basin. Little information is currently available concerning native trout populations, seasonal distribution and movements throughout the Middle Fork Malheur River. What information there is on this area indicates that bull and redband populations are severely threatened. This project outlines a plan to assess habitat conditions, salmonid population structure and dynamics through the use of radio telemetry, screw traps, habitat assessments and genetic analyses. This project will assist us in achieving the goals and objectives defined in the Northwest Power Planning Council's 1994 Columbia River Fish and Wildlife Program. This project also complements the management plans outlined in the Malheur Wild and Scenic River Management Plan and the Department of Fish and Wildlife's Malheur Management plan. Assessment of these surveys will be the basis of recommendations for enhancement and protection strategies that are in line with council measures. Implementation of these strategies will provide the native salmonids with suitable habitat and increase population numbers.

Section 7. Project description

a. Technical and/or scientific background.

The headwaters of the Middle Fork Malheur are located on the south slope of the Strawberry Mountains, approximately 200 rivermiles (RM) upstream from the Snake River. Several tributaries converge at the southern edge of Logan Valley, where they form the mainstem of the Middle Fork Malheur. The Paiutes for the collection of

anadromous fish historically used Stinkingwater Creek, a tributary to the Middle Fork Malheur. The construction of Warm Springs Dam in 1919 on the Middle Fork Malheur, effectively ended the migration of anadromous fish from the Middle Fork forever. Construction of the Brownlee Dam in 1958, on the Snake River, has prohibited the migration of anadromous fish from the entire upper Snake River basin (Pribyl and Hosford, 1985). The result is a drastically altered environment, causing significant losses to the Paiute people, as well as to the wildlife in the region that depended on the salmon for substance.

In addition to the loss of anadromous fish in this area, resident fish have also suffered significant losses due to land-use factors such as timber harvest, livestock production and irrigation withdrawals resulting in habitat degradation. For some time, it has been known that bull trout populations (*Salvelinus confluentus*) have been declining throughout their range (Howell and Buchanan, 1992; USDA (2), 1993; Kostow, 1995). Anecdotal information from long time residents in the area, indicates that bull trout were taken as far downstream as Wolf Creek (RM 168) in 1955 when both the North and Middle Forks of the Malheur were chemically treated (Bowers, *et. al.,* 1993). In 1993 Bowers *et. al.*, noted that in surveys of tributaries of the Middle Fork, bull trout were found in only two creeks, Lake Creek (RM 195) and Big Creek (RM 190). Ratliff and Howell, in 1992, listed habitat degradation as the primary cause for depletion of bull trout in this area. The opening of the canopy increases solar radiation and can warm the stream to temperatures that exceed bull trout requirements. Additionally, bull trout was held in low regard by anglers and fishery managers due to its supposedly poor fighting qualities and piscivorous habit (Bond, 1992). The Oregon Department of Fish and Wildlife stocked non-native brook trout until the late 1980's throughout the Middle Fork Malheur and its tributaries. Brook trout pose a serious threat to bull trout populations due to habitat competition and their ability to hybridize with bull trout resulting in a loss of genetic integrity (Ratliff and Howell, 1992; Leary, *et. al.*, 1983). In 1997, BPT surveys on the Middle Fork tributary, Summit Creek indicated that the majority of the brook trout concentrations are in direct conflict with bull trout habitat. Furthermore, the Warm Springs dam on the Middle Fork and Agency dam on the North Fork Malheur prohibits the migration of adfluvial fish causing additional genetic losses (Buckman, *et. al*., 1992). Currently, bull trout in the Malheur River system are listed as a Category 2 candidate species under the federal Endangered Species Act, additional information is required before a decision about listing can be made (USDA, 1993). The Malheur National Forest Plan designates bull trout as an indicator species for non-anadromous fish and riparian habitat in the forest. The assumption is that management activities that affect bull trout will affect a variety of other species in the same or similar habitat. Accordingly, measures to protect the indicator species will protect other species as well (Buckman, *et. al*., 1992).

Redband trout (*Oncorhynchus mykiss gairdneri*) in the Malheur River system is also listed as a Category 2 candidate species under the federal Endangered Species Act. The taxonomy and classification of redband trout has in the past been in a state of controversy. However, Behnke, in 1992, stated that "For fisheries management, the major significance of separate evolutionary lines leading to coastal rainbow and interior redband trout does not concern correct taxonomy. Rather it concerns differences in the

adaptive specialization's the two forms have acquired over several thousands of years and how these differences can be accommodated in management programs." In particular, redband trout are adapted to harsh arid environments (Wishard, *et. al*., 1984). Habitat degradation, as well as possible genetic deterioration, are the primary causes for the depletion of redband trout in the region. Construction of Warm Springs dam, Agency dam on the North Fork Malheur and the Brownlee dam on the Snake, has interrupted natural gene flow within the population (Pribyl and Hosford, 1985) in addition to the stocking of non-native trout that were stocking in the region. Protein work done by Ken Currens in 1996 demonstrated that there was number of populations in the Snake River and Harney Basin that have diverged from the typical ranges of the allele frequencies found inland rainbow trout of the Columbia River. He suggested that this could be one of two things; possible hybridization with non-native trout, or that these native populations may be more diverse that previously assumed

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 called for recommendations of to develop a program to protect, mitigate, and enhance fish and wildlife on the Columbia River and its tributaries that were affected by the development of hydroelectric activity. In 1997, the Burns Paiute Tribe (BPT), with funding provided by Bonneville, began developing a Fisheries Natural Resources Department with the intent to recover and preserve the health of native resident fish in the Malheur Basin. This project is a habitat and life history study designed to record the movements, seasonal patterns of bull and redband trout.

b. Proposal objectives.

Project Objectives

1. Identify overall habitat conditions in the Middle Fork Malheur and its tributaries.
2. Quantify population structure in current redband and bull trout populations.
3. Formulate an enhancement, protection and management recommendations.
4. Implement enhancement, protection and management recommendations.

c. Rationale and significance to Regional Programs.

c. *Rationale and significance*

The need to assess current habitat conditions and population dynamics of bull and redband trout in the Middle Fork Malheur has been discussed above. Assessment of the results of this project is essential to the choice, design and implementation of protection and recovery strategies, which will very likely be necessary in order to be consistent with the Northwest Power Planning Council's management strategies for the subbasin.

As noted earlier in this document, this project addresses program measures 10.1 and 10.2A.1 as well as other measures. Measure 10.1 explicitly states that the "program goal for resident fish is to recover and preserve the health of native resident fish injured by the hydropower system, where feasible, and , where appropriate, to use resident fish to mitigate for anadromous fish losses in the system." Measure 10.2A.1 states that highest priority should be given to recoverable native populations and that high priority should be given to area where anadromous fish are no longer present. The Malheur Basin meets

these qualifications, however, in order to "recover and preserve the health" of the remaining populations of native trout in the area, we must first determine their current state of health and understand their life history traits.

The Burns Paiute Tribe has been working closely with area agencies to develop this project so that it is in line with the objectives outlined in the ODFW's Malheur River Basin Fish Management Plan (1990) as well as the Malheur Wild and Scenic River Management Plan (USDA, 1993). The Tribe, working in conjunction with these agencies, has developed a similar project for the North Fork Malheur that will work in tandem with this project. The North Fork Malheur has never been stocked with brook trout. This fact makes the information and interaction between these two projects very useful in determining bull trout genetics and habits with and without cohabitation with brook trout. Studies done by the Oregon Department of Fish and Wildlife (1996) show that brook trout have a reproductive advantage over bull trout because they reach reproductive age earlier. Male brook trout generally mature in their second or third year, females in their third or fourth year (Buchanan, *et. al*., 1994). Fluvial bull trout reach sexual maturity at the age of 5 or 6 and some adfluvial forms were found to mature as late as 9 years in some river systems (Buchanan, *et. al*., 1994). The North Fork project has been submitted for funding. Both projects are essential for determining the overall health of the river system.

As stated, this project addresses several measures in the Power Planning Council's program, as well as management strategies outlined in the Resident Fish Manager's Caucus (1997). Past management practices and hydroelectric facility construction has altered the habitat to such an extreme that many of the native salmonids are extinct, threatened or endangered in the region. The objectives outlined in this proposal will begin to mitigate for the loss of anadromous fish in the region and compensate for the losses incurred by resident fish through habitat disintegration.

d. Project history

The tribe is currently carrying out a base line habitat and fish survey, and will continue this throughout 1998 and 1999. The Burns Paiute Tribe is in the initial stages of developing a Fisheries program, working closely with the Oregon Fish and Wildlife Department, the US Forest Service as well as active participation with local watershed councils. The tribe was without a biologist until May of 1997, who was joined by another biologist and two seasonal technicians in late June. Despite the late start, habitat surveys on several creeks totaling approximately 25 river miles, and fish surveys totaling approximately 40 river miles were completed. Additionally, 90 non-lethal samples of Redband trout were collected on three tributaries to the Middle Fork for DNA analysis. In 1998 and 1999, the Fisheries Department has plans to complete habitat and fish surveys on the Middle Fork and its tributaries, and obtain genetic samples for Redband trout on the main stem of the Middle Fork. This project was funded with BPA dollars totaling $200,000 for 1997 and $200,000 for 1998.

e. Methods.

Oregon Departmen of Fish and Wildlife is being, and will be used to assess current habitat conditions,fish population, and fish composition in the region. The Tribe will be using screw traps, radio telemetry, performing spawning surveys and assessing water quality using an Aqua Check water quality instrument that measures conductivity, dissolved oxygen, percent hydrogen and temperature. Based upon these estimates, recommendations will be made for upgrading habitat conditions and increasing natural salmonid populations. These enhancement measures will then be monitored and evaluated to determine the effectiveness of each recommendation. A complete description of methods used to evaluate habitat conditions and fish composition in the area will be detailed in the Stinkingwater salmonid project report to BPA in 1997.

Methods

1) Screw Traps - These traps will operate on the Middle Fork Malheur River at sites near Summit Creek , approximately 30 river miles below the headwaters. The second site will be placed immediately above Warm Springs Reservoir, approximately 65 mile from the headwaters. The traps are expected to operate in the Middle Fork for system during FY 2000 and 2001. Fish will be marked at the trap sites to contribute to population estimates and to calibrate trap efficiency.

2) Radio Implanting - Trapping of fluvial and resident forms will allow us to implant micro-radio transmitters. Fish will be trapped using Fyke nets. Thirty tags are expected to be employed (10 juvenile and 20 adult) during the first year of this project. Depending on the results of this effort, it is expected that 30 - 50 tags will be employed during FY 2000 and 2001.

   These fish will be tracked via walking and hiking, vehicle and airplane. Oregon Department of Fish and Wildlife (ODFW) is expecting to secure a minimum of 10 airplane flights from Oregon State Police. This plane is equipped with radio receivers and is routinely used in fish and wildlife tracking.

   Fluvial adult fish will be collected during the spring months in Beulah Reservoir using traps and Fyke nets. Radio tags and possibly PIT tags will be implanted to gather seasonal movement information. Traps and Fyke nets have been periodically used in reservoir inventories in the past 10 years and have proven effective in trapping bull trout.

3) Water Quality - The Burns Paiute Tribe will evaluate the water quality throughout the Middle Fork survey sites. We will be using an Aqua Check water quality instrument that measures conductivity, dissolved oxygen, percent hydrogen and temperature. There is also a possibility that we will measure nitrogen and phosphorous using a HACH Kit (this is dependent on funding and personnel).

4) FLIR Flights - Identification of cold water refugia and stream temperature profiles using Forward Looking Infrared (FLIR) videography. Approximately 100 mile of stream miles has been identified on both North Fork Malheur (40 miles) and Middle Fork Malheur (60 miles). Flight will begin at the Warm Springs Reservoirs (on the Middle Fork) and at Beulah Reservoir (on the North Fork) and proceed upstream to the headwaters including two major tributaries (Lake Fork and Big Creek) on the Middle Fork Malheur River. We will snorkel these cool water pockets to verify bull trout utilization. Film and report will be completed at Oregon State University, in cooperation with their staff.

5) Water Temperature Monitoring - A relatively large collection of water temperature data (using HOBO and DataPod recording instruments) has become available through the efforts of the Burns Paiute Tribe, USFS, BLM, and ODFW. This part of the project will provide the time to coordinate and implement this task under the leadership of the Burns Paiute Tribe. Through the use of thermographs and telemetry, we will identify temperatures experienced by bull trout in the basin. Thermographs will be place in the early spring or right after "ice out" and retrieved in late fall. The data will be used compiled by all agencies involved in this coop agreement.

6) Spawning Surveys - For the Past four years, Oregon Department of Fish and Wildlife has been leading the spawning surveys on the North Fork Malheur system. Funding for a continuation of this partnership with ODFW, BLM and the Burns Paiute Tribe is through current funding sources. This task will assist us in identifying seasonal movements, spawning area preference, and estimates in adult spawning populations and trend. Spawning surveys will begin on the Middle Fork after radios have been implanted. Bull trout populations are very sparse in this system and brook trout often give false identification of redds.

7) Genetic Sampling - We will take samples for genetic analyses from radio tagged bull trout. Montana State University has agreed to continue analyzing our samples to stay consistent with their previous analyses. Upon completion of our project, we will be able to compare the North Fork samples with the Middle Fork samples and better define any genetic variation within the two disjunct populations.

8) Habitat surveys will continue for 1999 and 2000. Streams and creeks have been targeted for surveys using Oregon Department of Fish and Wildlife, Aquatic Inventory Methods for Stream Habitat Surveys. This method was chosen by the Tribe as a means for us to compare relative data with other surveys done in prior years by the state.

9) Fish surveys will continue throughout 1999 and 2000. We will be using a riffle-pool-riffle survey every 1/4 mile, using a Smith-Root modle 12B electroshocker. Sight are chosen indescriminatley and sampled according to prior surveys done by ODFW. This data will aso be compatible with the state and federal acencies who have done historical surveys on the Malheur Basin.

f. Facilities and equipment.

The Natural Resources Department of the Burns Paiute Tribe is located in a small office building located on the Burns Paiute Reservation. The office is equipped with computers and printers for the Mitigation Coordinator and the two biologists. The tribe also has two 1997 4X4 Ford F-150 pick-up trucks that are being leased through the Stinkingwater salmonid project. The genetics portion of this project will be performed in a laboratory at a major university that has not yet been specified. This project has also purchased the following equipment:

Gill nets
Back-pack electroshocker
Cell phone
Miscellaneous survey equipment (thermometers, flagging tape, measuring devices)

In addition, the program will need to purchase 2 screw traps, misc. support cable, 2 dry suits, 2 sets of snorkel gear, 2 sets of chest or hip waders and a digital camera.

g. References.

Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society Monograph 6.

Bond, C.E. 1992. Notes on the nomenclature and distribution of bull trout and effects of human activity on the species. Pages 1-4 *in* Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of the American Fisheries Society, Corvallis.

Bowers, W.E., P. Dupee, M. Hanson and P. Perkins. 1993. Bull trout population summary, Malheur River Basin. Oregon Department of Fish and Wildlife, Hines, Oregon. Unpublished Report.

Buchanan, D.V., A.R. Hemmingsen and K.P. Currens. 1994. Native trout project. Oregon Department of fish and Wildlife Fish Research Project F-136-R-07, Annual Progress Report, Portland.

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Buckman, R.C., W.E. Hosford and P.A. Dupee. 1992. Malheur River bull trout investigations. Proceedings of the Gearhart Mountain bull trout workshop.

Howell, P.J. and D.V. Buchanan (editors). 1992. Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of the American Fisheries Society, Corvallis.

Kostow, K. (ed). 1995. Biennial report on the status of fish and wildlife in Oregon.

Leary, R.F., F.W. Allendorf and K.L. Knudsen. 1983. Consistently high meristic counts in natural hybrids between brook trout and bull trout. Systematic Zoology, 32(4):369-376.

Northwest Power Planning Council. 1995. Columbia River Basin Fish and Wildlife Program 95-20.

Pribyl, S.P. and W.E. Hosford. 1985. Malheur basin wild trout evaluations. Information Report Numbers 85-5. Oregon Department of Fish and Wildlife. Hines, Oregon.

Ratliff, D.E. and P.J. Howell. 1992. The status of bull trout populations in Oregon. Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of the American Fisheries Society, Corvallis.

United States Department of Agriculture. 1993. Malheur Wild and Scenic River Management Plan. United States Forest Service, Pacific Northwest Region. John Day, Oregon.

Wishard, L.N., J.E. Seeb, F.M. Utter and D. Stefan 1984. A Genetic Investigation of Suspected Redband Trout Populations. Copeia, 1:120-132.

Section 8. Relationships to other projects

This project works in concert with regional projects by the Oregon Fish and Wildlife(ODFW, 1990) and the US Forest Service (USDA, 1993).

Section 9. Key personnel

Dyan Straughan

Education: Masters of Science, Population Genetics. California State University, Long Beach. 1997
Bachelor of Science, Biology major, Chemistry minor. University of Oregon. 1994

Tribal Biologist/Geneticist. Burns Paiute Tribe. Burns, Oregon. 1997-Present. FTE 2080. Duties include assisting and implementing project design, field collections, analyzing and interpreting data, monitor and administrate all budget activities.

Daniel Gonzalez
Education: Bachelors of Science, Fisheries Science. Oregon State University. 1996
Bachelors of Science, Wildlife Science. Oregon State University, 1995
Fisheries and Wildlife Biologist. Burns Paiute Tribe. Burns, Oregon. 1997-Present. FTE 2080. Duties include implementing and assisting with project design, field collection, analyzing and interpreting data and active in Harney County and Malheur-Owyhee Watershed Councils and the Governors Watershed Enhancement Board.

Section 10. Information/technology transfer

Project results can be found in quarterly and annual reports to the Bonneville Power Administration. Monthly or quarterly reports will be sent to local watershed councils (Harney County and Malheur-Owyhee). These results will also be submitted for peer reviewed journal articles. The results will also serve as an internal document for the Burns Paiute Tribe Natural Resources Department and any other interested parties.